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I, Lodovico Passalacqua, having been duly sworn, depose and say that the enclosed translation of THE PATENT APPLICATION FOR "BEVERAGE CAN HAVING A PROTECTIVE COVER AND METHOD AND DEVICE FOR APPLYING A PROTECTIVE COVER TO BEVERAGE CANS", APPLICATION NUMBER 199 47 273.4, FILED SEPTEMBER 30, 1999 BY KRONES AG, has been translated into English by Burg Translations, Inc., and that, according to the best of my knowledge and belief, it is a true and accurate rendering of the original German document.



Lodovico Passalacqua, Manager

Subscribed and sworn before me on
January 16, 2006.

John R. Emerzian, Notary Public

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John R. Emerzian
Notary Public, State of Illinois
My Commission Expires Jan. 11, 2007

FEDERAL REPUBLIC OF GERMANY



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and Method and Device for Applying a
Protective Cover to Beverage Cans

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The attached pages are a correct and accurate reproduction of the original documents of this patent application.

Munich, August 10, 2000
German Patent and Trademark Office
The President
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[signature]
Seiler

Beverage Can Having a Protective Cover and a Method and a Device for Applying a Protective Cover to Beverage Cans

Description

The present invention relates to a beverage can having a protective cover as well as a method and a device for applying a protective cover to beverage cans.

In the case of filled and closed beverage cans, to prevent dust, fluids or similar impurities from collecting on the surface and in recesses on the lid of a beverage can and therefore permit hygienic emptying of such cans after opening, the use of safety caps made of plastic or a similar material in a wide variety of embodiments that can be snapped onto cans has been proposed.

Disadvantages of these solutions include the considerable additional cost, the negative effect on the appearance of the beverage cans as perceived by an accustomed user, the inferior stackability and therefore palletizability and the limited possibility of accurately adapting these safety caps to the remaining appearance of the can in terms of both coloration and print image.

The object of the present invention is to provide an especially inexpensive safety cap for beverage cans and a method and a device for applying these safety caps to beverage cans.

This object is achieved by a thin metal foil, in particular tin foil¹ or aluminum foil applied to the top side of a closed beverage can, the lid surface of which is completely covered. The dimensions of the tin foil are preferably such that the tin foil also covers and extends beyond the flanged end between the can lid and the can body. In the case of beverage cans having a shoulder surface that is shaped radially inward, this may also be covered advantageously by tin foil. The tin foil may be advantageously shaped directly to the contour of the lid and shoulder by pressing it with sponge pads, brushes or the like. According to a refinement of this invention, to improve the hold of the tin foil, the tin foil may be attached to the can, e.g., to the flange of the lid, which is designed to be elevated, attaching it by using in at least some areas an adhesive that is safe for use with foods.

Furthermore, it is advantageous to manufacture the foil used as a dust guard as well as the cam from the same material, e.g., aluminum, which then simplifies recycling. Another advantage is that the foil can be pulled away from the can's lid with no problem and can be crumpled up and thrown in the interior of the can after emptying. This ensures environmentally friendly disposal of the protective cover.

¹ Translator's note: The source uses Stanniolfolie, literally "tin foil" but the term is also used loosely to mean "aluminum foil."

Other advantageous embodiments of this invention are the object of the subclaims.

A preferred exemplary embodiment is explained below with reference to the figures.

They show:

- Figure 1 a beverage can with a protective cover,
- Figure 2 an outfitting machine for applying the protective cover to beverage cans in a schematic view from above,
- Figure 3 a side view (in the direction of view X) of the protective cover transfer device of the outfitting machine according to Figure 2,
- Figure 4.1 a side view of part of a carousel of the outfitting machine according to Figure 2
through 4.3 in various working positions,
- Figure 5 a beverage can with another protective cover.

Figure 1 shows a beverage can 1 for beer, cola or the like, the top section of which, i.e., the lid surface 1a and the recessed shoulder surface 1b is completely covered by a thin metallic protective cover 3. Above the beverage can, the protective cover 3 is shown in its original flat form, which it has before being applied and shaped to a beverage can. The protective cover 3 in the present embodiment has a circular outer contour, with the outside diameter being selected so that after the foil has been shaped to conform to the top of the can. The protective cover 3 covers not only the lid surface 1a, but also the flange 1c between the lid 1a and the can body 1d as well as the inclined shoulder surface 1b adjacent up to the transition to the cylindrical area of the can body 1d.

The protective cover 3 consists of a non-laminated aluminum foil having a thickness of 10 micrometers and a vermicular embossing with a depth of 80 micrometers. The front side of the aluminum foil facing upward is printed to match the coloration of the can body and may have additional information or advertising imprints. The aforementioned vermicular embossing of the film imparts to it an excellent moldability and allows it to conform perfectly to the spatial curvatures in the pot-shaped area of the can lid 1a and the inclined shoulder face 1b of the beverage can.

An adequate form fit is achieved simply by carefully pressing and shaping the protective cover 3 to the can contour. In addition, however, an adhesive may also be applied between the protective cover and the can in at least some areas as needed, e.g., to the flange 1c protruding upward between the can lid 1a and the can body 1d. An adhesive that is safe for use with food may be used for this purpose, e.g., Lesso VN 6349. This adhesive serves only to secure the film and is

applied in such a thin layer that after the protective cover 3 has been removed, no perceptible or tangible adhesive residues are left on the can.

Figure 2 shows an outfitting machine 2 that is suitable for applying such protective covers, shown schematically in a view from above. A carousel 5, a feeding star wheel 6 and a discharge star wheel 7 are rotatably mounted on a tabletop 4 of the machine, with the two star wheels mentioned above running tangentially to the outer circle of the carousel 5. A conveyor belt 8 running tangentially to the two star wheels 6 and 7 is provided for feeding and discharging the cans 1. A sorting screw 9 is located in the area in front of the feeding star wheel 6 and parallel to the conveyor belt 8. A transfer device 10 for transferring the protective cover 3 is located with a distance above the conveyor belt 8 and the feeding star wheel 6, close to the can transfer point from the sorting screw 9 into the feeding star wheel 6. The transfer device 10 is mounted so that it is adjustable in height for adapting it different can heights by means of a device 28 operable by electric motor.

All the cam conveying elements of the machine and the transfer system 10 mentioned above can be driven continuously in synchronization and revolving in the proper positions in relation to one another by a machine drive.

The side view of the transfer system 10 depicted in Figure 3 shows that in a housing 11, a first rotor 12 is mounted with several pallets 13 distributed uniformly on a graduated circle. Each of these pallets 13 has a curved adhesive surface 13a which is equipped with numerous vacuum openings and is eccentrically mounted on an eccentric shaft 13b pivotably mounted in the rotor 12. On the end of the shaft 13b protruding into the housing 11, a roller lever is mounted in a manner not shown here, its castor engaging in a closed cam groove (also not shown here) in the housing 11. The shape of the curve determines the oscillating pivoting movement of the adhesive surfaces 13a and is designed so that when the rotor 12 rotates in the direction of the arrow in the area of a film blank container 14 that is fixedly arranged on the periphery of the rotor 12 and contains pre-stamped protective covers 3, the adhesive surfaces roll on the front film blank, thereby removing the blank from the container due to the vacuum effect and supplying it to a second rotor 15 in the remaining course, said second rotor being arranged on the periphery of the first rotor 12 so that it points to the conveyor belt 8.

This second rotor 15 is designed as a mechanical gripper cylinder having a plurality of elastic pressure pads 16 arranged so they are uniformly distributed on its circumference, a pivotable gripper finger 17, operable by a roller lever 18 in combination with a stationary radial cam (not shown) being assigned to each of these pressure pads 16. A protective cover 3 which is on an adhesive surface 13a can be removed from the pallet 13 by the gripper finger 17 gripping the edge of the label and then it can be attached to the can lid 1a or the can edge 1c of a can 1 being passed by the gripper cylinder 15 so that it is concentrically aligned. Upstream from the gripper cylinder 15 as seen in the direction of conveyance, a rotating glue roller 19 may be mounted at

the height of the can lid for applying an adhesive that is safe for use with food to the can edge 1c above the conveyor 8.

The height of the transfer device 10 is selected so that the distance from the top side of the conveyor belt 8 to the outer periphery of the revolving elastic pad of the second rotor 15 is slightly lower than the height of the sealed can 1, so that at least the flange 1c between the can lid 1a and the can body 1d and preferably also the can lid itself are partially immersed in the flexible pad 16 in passing by the second rotor 15, and the protective cover 3, which is held concentrically with the can lid, is thereby pressed at least a few millimeters in the direction of the can lid 1a.

Then the can 1 with the attached protective cover 3 is sent from the receiving pocket or holding elements of the star wheel 6 to the carousel 5, which has a bottle table (not shown in detail) having a plurality of placement spaces 20 arranged on a graduated circle. A slide valve 21 which can be raised and lowered in a controlled manner and whose end pointing toward the placement space 20 has a centering cone 21a that is form-fitted to the can shoulder 1b with an inserted sponge pad 22 is assigned to each of these placement spaces 20. The inside diameter of the conically shaped interior of the centering cone 21a is designed to be slightly larger than the outside diameter of the can lid 1a. The elastic sponge pad 22 inserted into the centering cone is adapted to the shape and dimensions of the can lid accordingly.

According to Figure 4.1, the centering cone 21a is guided together with the inserted sponge pad 22 on a carrier 24 revolving in angular synchronization with the placement spaces 20 so that it can be raised and lowered. A cam roller 25 engaging in a stationary radial cam 26 is mounted at its upper end. Figure 4.1 illustrates the situation at the point of transfer of the cans 1 from the feeding star wheel 6 to the carousel 5. Immediately thereafter the slide valve 21 is lowered by the descending radial cam 26 due to the rotation of the carousel 5 and the carrier 24, so that the can 1 becomes engaged with the centering cone 21a and the sponge pad 22 on the top side of the lid, so that ultimately the can 1 is axially secured between its bottom and its lid and is centered by the centering cone. In this process, a circular shoulder of the sponge pad 22 protruding like a step presses the protective cover 3 into the pot-like recess in the can lid 1a to conform to its contour, while the edge of the protective cover and/or its circumferential section is applied to the inclined shoulder face 1b of the can body with the complete immersion into the sponge pad 22 around the flange 1c (Figure 4.3).

In the remaining course of rotation of the carousel, the centering cone 21a is moved upward by the radial cam 26 together with the slide valve 21. Even before reaching the discharging star wheel 7, the slide valve 21 is raised by the radial cam 26, which is rising in this area, to the extent that the centering cone 21a together with its sponge pad 22 is taken off the can lid 1a and then transferred again to the position shown in Figure 4.1. in the area of the discharging star wheel 7. Another pressure treatment of the protective cover 3 may be performed by brushes, sponge rollers or rotating brushes (not shown) before the completely outfitted can 1 is transferred

to the outgoing conveyor belt.

In deviation from the exemplary embodiment described above, the pallets 13 of the foil transfer apparatus 10 may have adhesive surfaces to which adhesive may be applied, i.e., they operate without vacuum support. In this case, a rotating glue roller 27 (shown with dashed lines in Figure 3) is arranged on the path of revolution of the pallets, as seen in the direction of rotation, and in front of the foil container 14 for moistening the pallet adhesive surfaces by a rolling movement. The pallet adhesive surfaces may be equipped with raised segments, e.g., a circular segment corresponding to the edge of the can, to receive the adhesive.

The exemplary embodiment according to Figure 5 differs from that in Figure 1 in that the protective cover 3' here is formed by a square foil blank, which is especially inexpensive to manufacture. The protective cover 3' is manufactured in the same way as described for a circular protective cover 3 with reference to Figures 2 through 4. After it conforms completely to the shape of the can, the protective cover 3' forms four points that run downward on the can shoulder 1b and/or on the can body 1d. This creates the appearance of so-called "pointed tin-foil covering" such as that commonly used on beer bottles having high-quality contents. In addition, the points also serve as pull-tabs.

Furthermore, it is conceivable for the diameter to be reduced on the protective cover 3 manufactured from a circular blank according to Figure 1 such that the protective cover essentially covers only the can lid 1a and possibly the can edge 1c. In this case, it is expedient to provide at least one pull-tab 23, such as that indicated with a dash-dot line in the figure.

Patent Claims

1. Beverage can (1) having a protective cover 3 in the lid area, wherein the cover (3) is made of embossed aluminum foil.
2. Beverage can according to Claim 1, wherein the aluminum foil is not laminated.
3. Beverage can according to Claim 1 or 2, wherein the aluminum foil is nine to fifteen micrometers thick.
4. Beverage can according to any one of Claims 1 through 3, wherein the depth of embossing of the aluminum foil is sixty to one hundred micrometers.
5. Beverage can according to any one of Claims 1 through 4, wherein the aluminum foil has a vermicular embossing.
6. Beverage can according to any one of Claims 1 through 5, wherein the protective cover (3) is joined by adhesive to the beverage can (1).
7. Beverage can according to Claim 6, wherein the adhesive is applied to the central area of the can lid (1a).
8. Beverage can according to Claim 6 or 7, wherein the adhesive is applied to the upper can edge (1c).
9. Beverage can according to any one of Claims 1 through 8, wherein the protective cover (3) has a rotationally symmetrical basic shape.
10. Beverage can according to any one of Claims 1 through 8, wherein the protective cover (3) has a polygonal basic shape.
11. Beverage can according to Claim 10, wherein the protective cover (3) has several downward running points on the can (1).
12. Beverage can according to any one of Claims 1 through 11, wherein the protective cover (3) conforms to the contour of the can lid (1a) and the upper can edge (1c).
13. Method for applying a protective cover to a beverage can, wherein an essentially flat blank (3) of embossed aluminum foil is brought into contact with the beverage can (1), covering at least the can lid (1a), and is made to conform at least to the can lid (1a) with plastic deformation.

14. Method according to Claim 13, wherein the blank (3) has a larger area than the can lid (1a) and also conforms to the can edge (1c) and optionally also to the can shoulder (1b).
15. Method according to Claim 13 or 14, wherein the adhesion between the beverage can (1) and the protective cover (3) is achieved exclusively through the form-fitting interlocking effect produced in contouring.
16. Method according to Claim 13 or 14, wherein adhesive is applied to the blank (3) and/or the beverage can (1) prior to contact.
17. Device for applying protective covers (3) in the top area of beverage cans (1), comprising a conveyor apparatus (5, 8) for upright cans, a placement apparatus situated above the conveyor apparatus for blanks made of embossed aluminum foil, said apparatus placing the protective cover from above onto the top area of the cans from above and pressing it at least partially against the lid area and/or the can edge.
18. Device according to Claim 17, wherein at least one pressing device is situated downstream from the placement apparatus (1) for the protective cover (3), said pressing device pressing the protective cover against the lid area and/or the shoulder area of the cans (1).

Abstract

The present invention relates to a beverage can having a protective cover, and a method and device for applying a protective cover in the area of the lid of a beverage can, where the protective cover is made of embossed aluminum foil. An essentially flat blank of embossed aluminum foil is brought in contact with the beverage can at least in the area of the lid and is pressed at least against the can lid with plastic deformation. The cans in an upright position are passed under a placement device for blanks made of embossed aluminum foil, with the blanks being placed on the top area of the cans and at least partially pressed against the lid area and/or the can edge.